

Preparation for Bioterrorism: An 80% Solution Little Hoover Commission

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September 2002

Outline

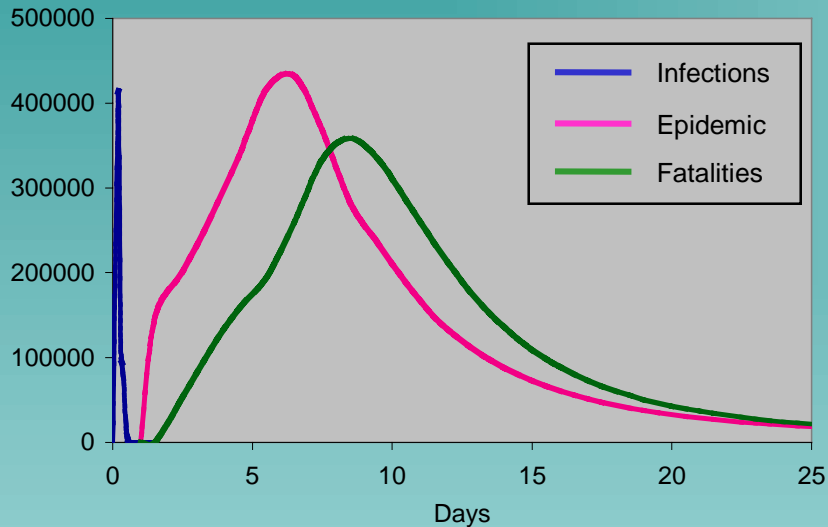
- Biological Weapons: Hours Matter
- Consensus views from National Defense University
- What do veterinarians, doctors, public health officials and decision makers want, anyway?
- One solution: RSVP
- Next steps
 - How to keep physicians up to date
 - How to avoid doing something silly

My Biases

- There are no experts in biological weapons
- With use of biological weapons, there is no disaster “site”
- In clinical, non-military medicine, top down approaches fail
- We will never have sensors everywhere
- We already have sensors everywhere
- MDs don't care much about public health
- MDs do care about individuals, but they are ridiculously busy
- doing something is not always better than doing nothing
- it's better to be approximately correct than be precisely wrong
- 80% solutions are here now

BW: Hours Matter

Scenario: Line Release of Anthrax (100kg) in NYC, DC, and LA



**3,500,000 fatalities
without intervention**

Case 1: Medical surveillance cues medical intervention on day 3

Medical intervention:

- prophylaxis program using doxycycline
- assumed 70% effective at preventing symptoms

**1,300,000
fatalities**

Case 2: HEPA filtration; Environmental Monitoring cues medical intervention on day 2

HEPA filtration

- 25% of population in buildings with filtration
- filtration assumed 100% effective at preventing exposure

Medical intervention:

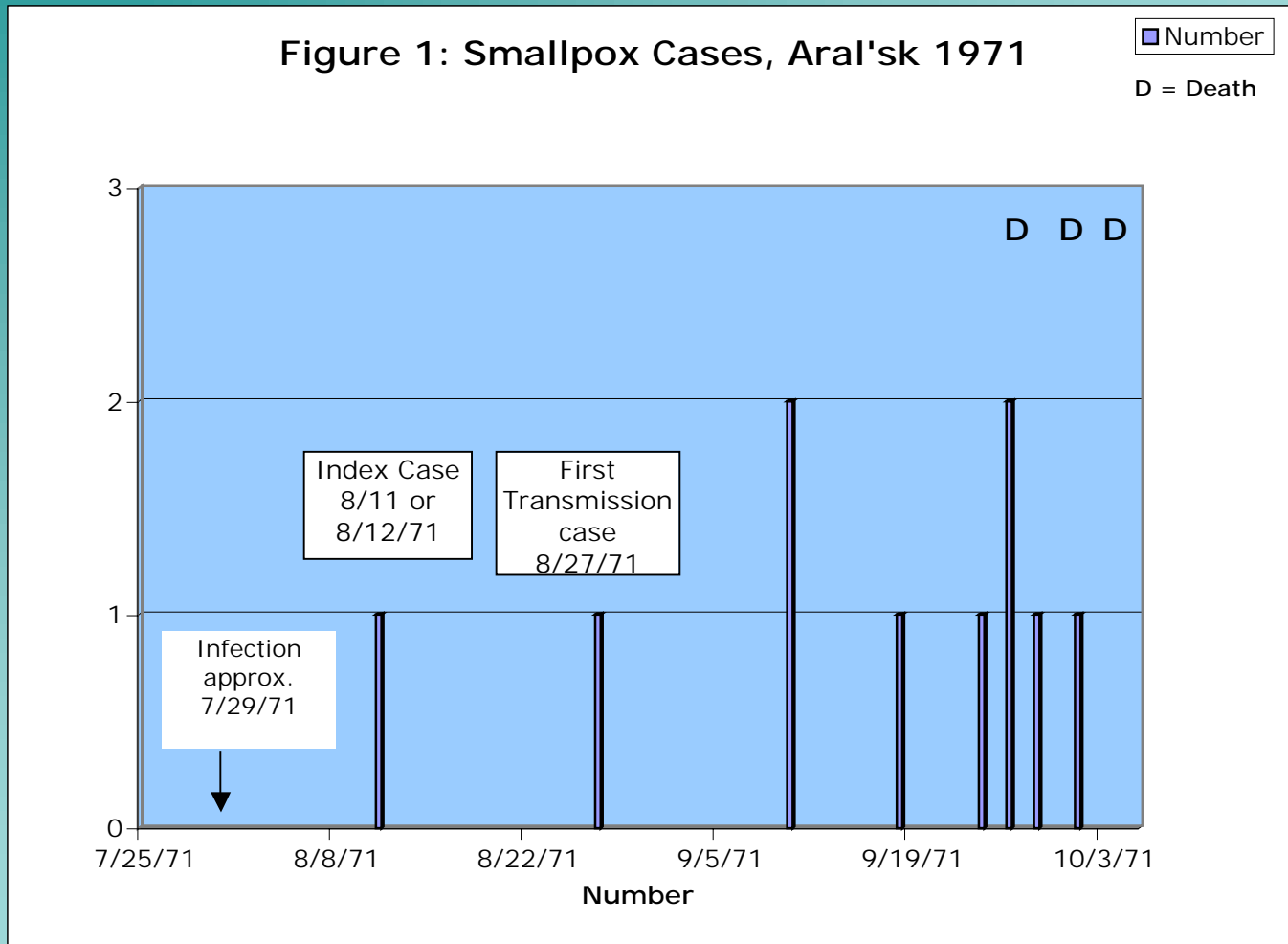
- prophylaxis program using doxycycline
- assumed 70% effective at preventing symptoms

**850,000
fatalities**

The course of the Lev Berg



Summary of Cases



The course of the Lev Berg



NDU: Observations on Bioterrorism (BT)

- In the anthrax outbreak, clinicians were key decision-makers
- There are 8,000 public health agencies, without co-ordination
- No mandate, incentive, or on going funding
- Maintaining continuous situational awareness will be very hard
- We need adaptive decision-making
- Incidence command structure will probably not work in medicine
- Medical system and public health are separate systems
 - Bottom Line: “Can we make public health part of medicine?”

Consensus Commentary on BT: NDU

- We have a dirth of experience, including among clinicians
 - Training and research are necessary and must be *inherent*
- Medicine and public health, like politics, are local phenomena
- Risks of the solution (or treatment) must be perceived to be less than the risks of disease
- Remember what the public will accept
- Remember what the public will believe
- The Media is your friend or your enemy--> you choose
 - but, you better have reliable, up-to-date information

Synthesis: Requirements for a BW surveillance system

- *Continuously* available communications on a “Need to Know” basis
- Low cost, epsilon-->zero intrusiveness to individuals
- Reliable, low cost, low intrusiveness to physicians
- Make public health part of medicine, and medicine part of public health
- Take the load off of labs, where possible
- Training for health-care providers should be inherent in system
- Local entities control data, but
 - other agencies should have easy access to information
 - high level agencies have selective access
- A “BW surveillance” system must be sustainable on its own merits

Problem: Early Identification of Disease

- Current reporting is “disease-based”
 - Laboratory confirmation
 - Slow
 - Sometimes insensitive, but still VERY helpful
- Physicians/Veterinarians rarely report unusual symptoms
 - Reporting may be laborious
- Public health response may be slow, but it is authoritative
 - data dissemination is slow
 - may be of no utility to practicing physician
 - rare use of geographic tools

What do doctors want?

- minimal data input requirements
- timely advice from public health officials only “when necessary”
- routine data regarding ongoing outbreaks
- painless BW training and seamless integration with daily tasks

What do public health officials want?

- routine surveillance
- rapid alerting of serious diseases
- tools for analysis
- easy communication with physicians
- low cost, low intrusiveness

A Solution: “SLaP” surveillance Syndrome - Lab - Public Health

- “Bottom Up” approach
- Geographic information
- Clinical information
 - Symptoms -- patient complaints
 - Signs -- physician examination
- Data entry is easy and fast
- Immediate dissemination to:
 - physicians
 - public health officials
- Rapid data analysis

Syndromes: Combinations of “signs and symptoms”

The Rapid Syndrome Validation Project uses:

- Influenza like illness / undifferentiated febrile illness
- Acute hepatitis
- Fever with Central Nervous system findings
- Fever with rash
- Acute severe (or bloody) diarrhea
- Adult Respiratory Distress Syndrome

- On-line RSVP Demonstration

Practical Experience to Date

- 40 physicians in 4 clinics
- over 1 year
- New Mexico Department of Health
- Average physician use
 - reviews “infectious disease background” daily
 - values data from other physicians
 - reports severe cases
 - one alarm to Department of Health
- Unknowns
 - robustness of reporting

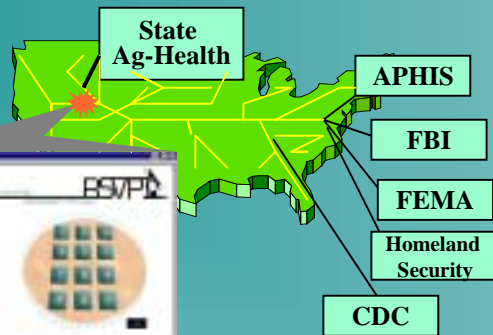
RSVP Installations and Next Steps

- New Mexico
 - Las Cruces -- Pediatrics, FP, Urgent Care, ER
 - Albuquerque -- 8 Community Health Care Clinics, 1 Occupational Medicine Clinic
- California
 - Livermore -- 1 Occupational Medicine Clinic
 - Kaiser Permanente, Northern California Emergency Rooms (3)
- Texas
 - Brownsville -- 6 Community Health Center Clinics
 - Lubbock -- 6 Community Health Care Clinics
- Singapore
 - 24 polyclinics (approximately 20% of population)
- RSVP for ANIMALS (RSVP-A)
- Continuing Medical Education -- Automated! Via recognized commercial provider
- NATO Military and Dependents medical clinics

RSVP-A (Animals)

A System for Rapid Detection of a Bioterrorism Attack on Livestock

RSVP-Animals



RSVP-Animals is a syndrome monitoring system for the early detection and reporting of disease outbreaks in animals.

Operational Capability:

- Concept is to build an internet-based network that links ranchers, stockers in stockyards, and veterinarians with USDA/APHIS and emergency planners to expedite the response to infectious animal disease outbreaks.
- Continuous interactive system for lay-stockers and veterinarians to report large-animal syndromes associated with dangerous, infectious disease outbreaks (location by county, type of animal, syndrome, environmental conditions, and time data).
- RSVP-Animal will mitigate agroterrorism consequences by quick detection of infectious diseases, reduced economic impact on agri-business, and reduced psychological impact public.

Technical Approach:

- **Rapid Syndrome Validation Project (RSVP)-Humans** was developed to monitor human syndromes associated with infectious human diseases. It is now ready for nationwide deployment.
- **RSVP-Animal** is being developed as a corollary system to RSVP-H, designed to provide rapid feedback to stockers, veterinarians, state agriculture agents, and national-level monitors on the health of livestock.
- **RSVP-Animal** will have specific syndromes identified for each type of animal (e.g., beef cattle/dairy cattle, horses, swine, sheep):
 - Animal syndrome data entered into *handhelds(PDAs)* in field
 - Syndrome reports apply a “knowledge engine” to screen data, analyze clusters for outbreak signals, and to aid in the rapid investigation of emerging infectious diseases.

Customers and collaborators:

- U.S. Department of Energy, Office of Nonproliferation and National Security, Chemical and Biological Nonproliferation Program
- U.S. Department of Agriculture, APHIS and ARS
- Kansas State University, College of Veterinary Medicine

For additional information, contact:

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Web Site: rsvp.sandia.gov

- General Description
- Manual - Latest version 2.3
- Demonstration site (“SNL Demo”)
- Contact Information
 - Alan Zelicoff, Sandia National Labs - apzelic@sandia.gov

Realistic Vision

- California, Texas, New York: approximately 500 sites in FY03
- 100 - 150 “General Practice” Veterinary Sites in Kansas?
- Combination of Human/Animal data at public health level
- Commercialization coming soon
- Version 3.0
 - Automated statistical “extraction”
 - Neural network predictive model
 - Enhanced geographic tools